

## Original Research Article

# Phytochemical and Anti-cholesterol activity of *Aegle marmelos* (L.) Corr. leaf extract using in albino mice

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## ABSTRACT

In recent times, focus on plant research has increased all over the world and a large body of evidence has collected to show immense potential of medicinal plants used in various traditional systems. Over the last few years, researches have aimed at identifying and validating plant derived substances for the treatment of various diseases. Similarly it has been already proved that various parts of plants such as Leaves, fruits, seeds etc. provide health and nutrition promoting compounds in human diet. The Bael (*Aegle marmelos*) has enormous traditional uses against various diseases. The present review aims to compile medicinal values of *Aegle marmelos* generated through the research activity using modern scientific approaches and innovative scientific tools. The effect of the *Aegle marmelos* leaf extract was investigated with various solvent benzene and chloroform were examined and concluded that the *Aegle marmelos* leaf extract possess alkaloids, emodins, ferric chloride, lead acetate, gelatin, phenolics, volatile oils etc. and it shows the absence for flavonoids, steroids, triterpenes, anthracene glycosides etc. Result of present investigation reveals that the employed extracts exhibit potential anticholesterol activity. The plant materials have these beneficial properties which can be used for various medicinal purposes and can use by pharmaceutical company. From the analysis it is true to be said that this medicine can be used to a large extent, against all the disease caused by those tested organisms.

### Keywords

*Aegle marmelos*,  
Pharmacological  
Activities,  
Medicinal  
Values,  
Anti cholesterol  
activity.

## Introduction

*Aegle marmelos* is commonly known as Bael (or bel) belonging to the family Rutaceae. It is Indigenous to India and is abundantly found in the Himalayan tract, Bengal, Central and South India. It is extensively planted near Hindu temples for its wood and leaves which are generally used for worship. The bark is soft, light grey

and globose with woody rind and seeds are numerous. The roots are fairly large woody and often curved. Its fresh leaf juice is used in asthmatic complaints and jaundice (Dhuley 2007). The Chinese used for dysentery, some of the compounds have been screened for bioactivity (Singanan *et al.*, 2007).

The World is endowed with a rich wealth of medicinal plants. Herb shave always been the principal form of medicine in India and presently they are becoming popular throughout the world. As people strive to stay healthy in the face of chronic stress and pollution, and to treat illness with medicines that work in count with bodies own defenses. Medicinal plants have been used to curve a number of diseases.

The medicinal plants are rich in secondary metabolites and essential oils with therapeutic importance. The sample *Agele marmelos* possesses marmelosin, luvangetin, Psoralen, Tannins, and marmin (Maity *et al.*, 2009).

*Aegle marmelos* has useful effects in our body from the literature survey it has been found that most of the tribal people using the leaves for anti-diabetic, analgesic, anti-inflammatory, antipyretic, anti-cholesterol, anti-helminthic and antimicrobial activities. The unripe dried fruit is used to treat Digestive problem, stomache, diarrhoea and dysentery( Pitre and Srivastava 1987),“. The ripe fruit is a good and simple cure for dyspepsia and the unripe and half-ripe fruits improve appetite and digestion (Hema and Lalithakumari 1999);“.The roots and the bank of the tree and used in the treatment of fever and to control pain in the abdomen (Arul *et al.*, 2005). They are also useful in the disorders of Vata, Pitta and Kapha. The leaves are made in to a poultice and used in the treatments of ophthalmic. The rind of the ripe fruit is also sometimes used as a medicine (Dastur, 1962) . Due to its high medicinal value this plant is being exploited to a larger extent by the drug and pharmaceutical industries.

## **Materials and Methods**

### **Collection of Plant Materials**

The plants were collected from Thanjavur

district, Ariyalur district at Tamil Nadu state in India. The collected leaves were washed under running tap water to eliminate dust and other foreign particles and to cleanse the leaves thoroughly and dried.

### **Preparation of Plant Extracts**

Collected plants were cleaned, shade dried and ground as powder form. Then the samples were extracted by using different solvents (Benzene and Chloroform) in Soxhlet apparatus and concentrated by using rotator evaporator.

### **Source of Organisms**

The Albino mice were collected from Ganesh aquarium for experimental work and maintained in laboratory condition. The Albino mice were injected with Alloxan for the induction of Cholesterol level after the injection the plant extract was injected at various concentrations. The Mice was incubated at 40 – 42 °C for further analysis (Vimal,V, and Devaki,T.(2004).

### **Qualitative Phytochemical Evaluation**

The shade dried powder and various extracts of the leaves of *Aegle marmelos* were subjected to chemicals tests for its active constituents and pharmacological study according to the methodology proposed by (Gupta and Tondon 2004).

### **Determination of Anti Cholesterol Activity**

Cholesterol in acetic acid solution gives a red colour with ferric chloride and sulphuric acid. The intensity of the colour developed is directly proportional to the amount of cholesterol present in the sample.

To 0.1ml of serum, 10ml of ferric chloride-acetic acid reagent was added. It can be left over night to precipitate protein. It was

centrifuged and 5ml of the clear supernatant fluid was transferred to the test tube marked as “T”. To 10ml of cholesterol standard, 0.1ml of physiological saline was mixed and 5ml of the solution was transferred which was used as standard “S”. 5ml of ferric chloride acetic acid reagent served as Bland “B” 3ml of sulphuric acid was added to all the test tubes and allowed to stand for 30 mins. The intensity of the colour developed was measured calorimetrically at 560nm using a yellow filter.

### Results and Discussion

The main focus of the present work was phytochemical and anti cholesterol investigation of *Aegle marmelos* using albino mice. The secondary metabolites were extracted from the leaves of *Aegle marmelos* through Soxhlet apparatus and screened by phytochemical tests and identified the medicinal compounds. The

benzene extract was showed presence of Alkaloids, Emodins, Phenolics, Volatile oils, FeCl<sub>3</sub>, Lead acetate, Gelatin solution. It shows the absence of Flavanoids, Steroids and Triterpenes, Anthracene, glycosides, Xanthoprotein, Carbohydrates. The chloroform extracts was showed presence of xanthoprotein, carbohydrates. It shows absence of flavanoids, Anthracene, Glycosides, Steroids, Triterpenes. The phytochemical screening of the two different extract of *Aegle marmelos* (Table1). Different biochemical parameters were investigated and observed that the experimental animal showed variation in that biochemical parameters (Cholesterol) was observed increased after giving allaxon and after treating with plant extract it was observed that its gets the normal level of Cholesterol and also amino acid level alone gets increased.

**Table.1** Preliminary Phytochemical Screening of Different Extracts of *Aegle marmelos*

Name of the test	<i>Aegle marmelos</i> Benzene extract	<i>Aegle marmelos</i> Chloroform extract
Alkaloids	+	+
Emodins	+	+
Flavanoids	-	-
Steroids & Triterpenes	Both are absent	Both are absent
Anthracene glycosides	-	-
Phenolics	+	+
Volatile oils	+	+
1.FeCl <sub>3</sub>	+	+
2. Lead acetate	+	+
3.Gelatin solution	+	+
Xanthoprotein	-	+
Carbohydrates	-	+

**Table.2** Primary Health Checkup of Albinomice

S.NO	Weight of Albino Mice	Temperature	Gender
1	100grms	42°C	Male
2	105grms	40°C	Female
3	108grms	43°C	Male
4	112grms	43°C	Female

**Table.3** Effect of *Aegle marmelos* Extract Against the Body Weight of Albino Mice

S.NO	Parameters	Body weight before alloxan Injection (mg)	Body weight before alloxan Injection (mg)	Body weight After treatment (mg)
1	Control Group- I (without treatment)	120	120	120
2	Control Group- II (Alloxan treatment )	155	155	161
3	Control Group- III (Benzene treatment )	168	160	163
4	Control Group –IV (Chloroform treatment	162	155	165

**Table.4** Primary Health Checkup of Albinomice After Induction of Alloxan and Treating with *Aegle marmelos*

S.NO	Weight of albino Mice	Temperature	Gender
1	100grms	42°C	Male
2	105grms	40°C	Female
3	110grms	43°C	Male
4	120grms	43°C	Female

**Table.5** Effect of *Aegle marmelos* Extract Against the Blood Cholesterol Level of Albinomice

S.No	Parameters	Cholesterol Level before Alloxan injection (mg/dl)	Cholesterol Level after Alloxan injection (mg/dl)	Cholesterol Level after treatment (mg/dl)
1	Group - I (Control)	68±1.3	68±1.3	68±1.3
2	Group - II (Alloxan)	72±1.2	98±1.8	78±2.0
3	Group - III (Benzene)	70±1.5	105±1.5	81±1.8
4	Group - IV (chloroform)	71±1.8	105±2.0	85±1.2

The Primary health and temperature check up for albino mice, (body weight) which is

maintained in room temperature (Table 2). The induction of Cholesterol by using

alloxan to the albino mice and the temperature and body weight at different stages were noted (Table 3) the secondary health checkup of Albino mice from which we are able identify that are animal gets increased in temperature and bodyweight at laboratory condition and again reaches the primary level of temperature and body weight after treatment with our extract(table4).The cholesterol level estimate in control as well as treatment of plant extract. The control mice showed by the cholesterol at (81±1.8 gms, 85±1.2 gms) and the cholesterol to estimated followed chemical value of (induction of cholesterol) was gradually decreased the plant extract (Table 5).

Man cannot survive on the earth for long life without plant Kingdom because the plant products and their active constituents play an important role (Sudharaneshwari and Radhika, 2007). Bael has enormous traditional uses against various diseases and many bio active compounds have been isolated from this plant also (Maity *et al.*, 2009). The present study clearly indicated the significant anti cholesterol activity of *Aegle marmelos* leaf extract were tested for their hypoglycaemic affects of normal and cholesterol albino mice. Using solvent extraction of Benzene, chloroform of *Aegle marmelos* showed a reduction of blood cholesterol level. Hence it is concluded that both plant extract showed the better inhibitory effect in *Aegle marmelos*.

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